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Third day of September 2004

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**PROVISIONAL SPECIFICATION**

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**Invention Title:** Tape Applicator

## TAPE APPLICATOR

### FIELD OF THE INVENTION

The present invention relates to the application of tape to a  
5 substrate and has particularly use in the signwriting industry. In particular the  
present invention relates to a tape applicator for use in applying tape to  
signwriting vinyls.

Whilst the present invention will be described specifically with  
reference to signwriting vinyls, it will be understood that the tape applicator of  
10 the present invention may have many other applications where a tape needs  
to be applied to a substrate.

### BACKGROUND ART

Signwriting vinyls are used in the manufacture of signs and our  
15 widely used in the signwriting industry. The vinyls are applied to substrates to  
form signs. The vinyls are typically applied to a substrate with an adhesive.  
Generally the vinyl is supplied to the signwriter in rolls with the adhesive  
already applied to the vinyl. A backing sheet protects the adhesive and  
prevents the roll of vinyl sticking to itself.

20 In the preparation of signs the vinyls are attached to an  
application tape that is removably attached to the front face of the vinyl. The  
application tape allows the vinyls to be attached to a substrate whilst the front  
face of the vinyl is protected by the application tape. Further, in applying  
vinyls formed into complex shapes to a substrate in the application tape  
25 assists in preventing creasing or other damage to the vinyl resulting from the  
vinyl sticking to itself.

Application tape is generally applied manually to a vinyl in a  
process that often requires two operators, one to manipulate the vinyl and the  
other two manipulate the application tape. As the application tape includes a  
30 removable adhesive it can be cumbersome to handle in that it also tends to  
stick to itself. Particularly with the large signs formed from large vinyl panels  
the application of tape to a vinyl panel may require two or more persons.  
Signs prepared on-site often require the application tape to be applied in

exposed locations where wind can make the manipulation of the application tape more difficult.

We have now found a tape applicator that allows tape to be applied to a substrate in a manner that overcomes or ameliorates one or more of the disadvantages described above, or at least provides the consumer with a useful or commercial choice.

### SUMMARY OF THE INVENTION

In one broad form, the present invention provides a tape applicator for applying tape to a substrate, the tape applicator comprising a pair of nip rollers wherein the nip rollers comprise a tape roller and a substrate roller, the tape applicator further comprising a tension roller disposed in front of the substrate roller to tension the substrate prior to feeding between the nip rollers, a tape feed, and a drive for rotating the nip rollers.

Advantageously, the tape applicator of the present invention allows a tape to be applied to a substrate in a manner that is even and minimises entrapped air and oblique or creases in either the tape or the substrate by a single operator. The tape may be initially fed through the nip rollers and the leading edge of the substrate engaged in the nip rollers such that by driving of the nip rollers the substrate is feed through the nip rollers and the tape applied thereto.

The nip rollers preferably have a rubberised surface that provides good traction between the rollers and the respective tape and substrate. The nip rollers may be formed with a shaft upon which is disposed a thick rubberised collar or alternatively a cylindrical roller may be used with a thin rubberised sleeve.

The pair of nip rollers are preferably mounted for rotation on a frame. One or both of the new rollers may be driven by the drive. It is preferred that the nip rollers are mounted on suitable bearings.

The pair of nip rollers include a tape roller and a substrate roller. The tape roller is the roller against which the tape is borne as it is fed through the nip rollers. The substrate roller is the roller against which the

substrate is borne as it is fed through the nip rollers.

The pair of nip rollers may be spaced apart and rotatably mounted on a frame in a fixed or adjustable position. Where the thickness of the substrate and tape are constant then the rollers may be positioned in a preset spacing for application of the tape to the substrate. It is preferred that the nip rollers are sidedly mounted on a frame whereby the spacing between the nip rollers may be varied in use. It is preferred that the nip rollers are biased to a closed position whereby there is little or minimal spacing between the rollers. As the substrate and tape are fed between the pair of nip rollers the nip rollers may be urged apart yet still provide the desired pressure upon the substrate and tape for affixing the tape to the substrate. In one embodiment, with the nip rollers may be biased to a closed position using a spring attached to each end of one or both of the nip rollers. The spring or springs may be also attached to the other nip roller or alternatively to the frame.

The tension roller is disposed in front of the substrate roller to tension the substrate prior to feeding between the nip rollers. In a preferred configuration, the tension roller may be biased against the substrate roller such that the substrate is pressed and held against the substrate roller before it engages the nip. For the ease of locating the substrate between the nip rollers, it is preferred that the tension roller can be moved from an operative condition to a feed condition. In the operative condition that the tension roller presses the substrate against the substrate roller. In the feed condition the tension roller is moved away from the substrate roller such that the substrate can be really fed to the nip of the nip rollers. Preferably the tension roller is biased to the operative condition and may be held away from the substrate roller in the feed condition by an over centre mechanism or may be held away from the substrate roller using a latch member or the like. A handle may be provided on the tension roller or its associated mechanism to allow the operator to manipulate the tension roller between the operative condition and the feed condition.

The tape applicator includes a tape feed. It will be apparent to those skilled in the art that a variety of tape feeds may be employed in the

tape applicator of the present invention. In a preferred configurations, the substrate roller is disposed below the tape roller and a tape feed is provided immediately above the tape roller. In this configurations a convenient and preferred tape feed includes a pair of freely rotating spaced apart rolls upon  
5 which is supported a roll of tape that can be freely fed between the pair of nip rollers as the nip rollers rotate.

A drive mechanism for rotating the nip rollers is also provided in the tape applicator. The drive may be an automated electrical or mechanical drive or may be a manually operated drive. In one embodiment of the  
10 present invention a simple mechanical, and operated drive is provided in the form of a handle affixed to one of the pair of nip rollers. The handle may be affixed directly to one of the nip rollers or may be geared and to provide the desired gearing ratio. Alternatively, an automated drive may be provided by way of either a mechanical drive or an electrical drive for one of the nip  
15 rollers.

The tape applicator of the present invention is preferably mounted on a frame that is readily portable and can be moved from site to site. Preferably the frame includes mountings that allow it to be removably mounted to a suitable workbench or the like.

20 Vinyls are typically from 50 mm to 1.3 mm in width. It is preferred that the tape applicator of the present invention be able to accommodate a wide variety of vinyls or other substrates. In one preferred configurations the tape applicator will include nip rollers approximately 650 mm in width. In another embodiment of the tape applicator will include nip  
25 rollers approximately 1.3 m in width.

Advantageously, the tape applicator of the present invention allows two-person jobs to be efficiently and professionally completed by a single person. The tape applicator may also reduce material wastage as the damage to both the application tape and the substrate may be minimised by  
30 the efficient and professionally use of the tape applicator. We have found that the tape applicator of the present invention may also provide a better tape finish on the substrate, that is when peeling the backing from the substrate.

The transportability of the tape applicator of the present invention allows for the taking of vinyls on-site and even in windy conditions.

A manually operated tape applicator according to one of the embodiments of the present invention provides a tape applicator that requires  
5 little or minimal maintenance and is particularly cost-effective.

In order that the invention may be more fully understood and put into practice, preferred embodiments thereof will now be described with reference to the accompanying drawings.

10

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is front view of a tape applicator according to one embodiment of the present invention.

Figure 2 is a side view of the tape applicator shown in Figure 1.

Figure 3 is a cross-sectional view of the tape applicator shown  
15 in Figure 1.

Figure 4 shows the frame of the tape applicator shown in Figure 1.

Figure 5 is a perspective view of the tape applicator shown in Figure 1 with the tension roller in the operative condition.

Figure 6 is a perspective view of the tape applicator shown in  
20 Figure 5 with the tension roller in the feed condition.

Figures 1, 2 and 3 shows a tape applicator 1 having a frame assembly 2. A substrate roller 3 is rotatably mounted on the frame assembly 2. The substrate roller 3 includes a rubber sleeve 4. The substrate roller 3 is  
25 mounted on the frame assembly 2 by bearings 7 and 8. Bearings 7 and 8 are bolted to the frame assembly 2 with bolts 11 and 12 and 13 and 14 respectively. The tape applicator 1 has a tape roller 5 with a rubber sleeve 6. The tape roller 5 is rotatably mounted on the frame assembly 2 with bearings 9 and 10. Bearings 9 and 10 are mounted on the frame assembly with bolts  
30 15 and 16 and 17 and 18 respectively. Bolts 15 and 17 are tightened to allow the bearings 9 and 10 to be moved relative to the frame assembly. Bearings 16 and 18 pass through an elongated slot (shown in Figure 4) in the frame assembly 2 such that the tape roller 5 can move relatively to the substrate

roller 3 thereby controlling the gap therebetween. Springs 19 and 20 bias the tape roller to abut the substrate roller.

A pair of tape support rollers 21 and 22 are freely rotatably mounted on the frame assembly 2. A handle 23 is attached to the substrate roller 3 directly so as to enable the substrate roller 3 to be rotated by handle 23.

Figure 4 shows the frame assembly 2 has bores 25 and 26 for receiving the substrate roller 3 bolt holes 29, 30 and 32 allow the respective bearings 7 and 8 to be bolted to the frame assembly 2 with bolts 11, 12, 13 and 14. The tape roller 5 passes through bores 27 and 28 and the bearings 9 and 10 are engaged with the frame assembly 2 with bolts 15 and 17 that pass through bolt holes 33 and 34. Bolt slots 35 and 36 allow movement of the bolts 16 and 18 relative to the frame assembly 2 and allow the bearing 9 and 10 to move against frame assembly 2.

Figures 2 and 3 show the tension roller 41 in the operative condition against the substrate roller 3. In Figure 2 a roller of tape 24 can be seen resting on feed rollers 21 and 22.

Figures 5 and 6 are digital photographs that show the prototype manufactured according to the plans shown in Figures 1 to 4.

Persons skilled in the art will appreciate that the invention described above may be subject to improvements and modifications that will be apparent without departing from the spirit and scope of the invention described herein.

DATED this 25<sup>th</sup> day August 2003

Maree Gaye Miller

By Her Patent Attorneys

CULLEN & CO.



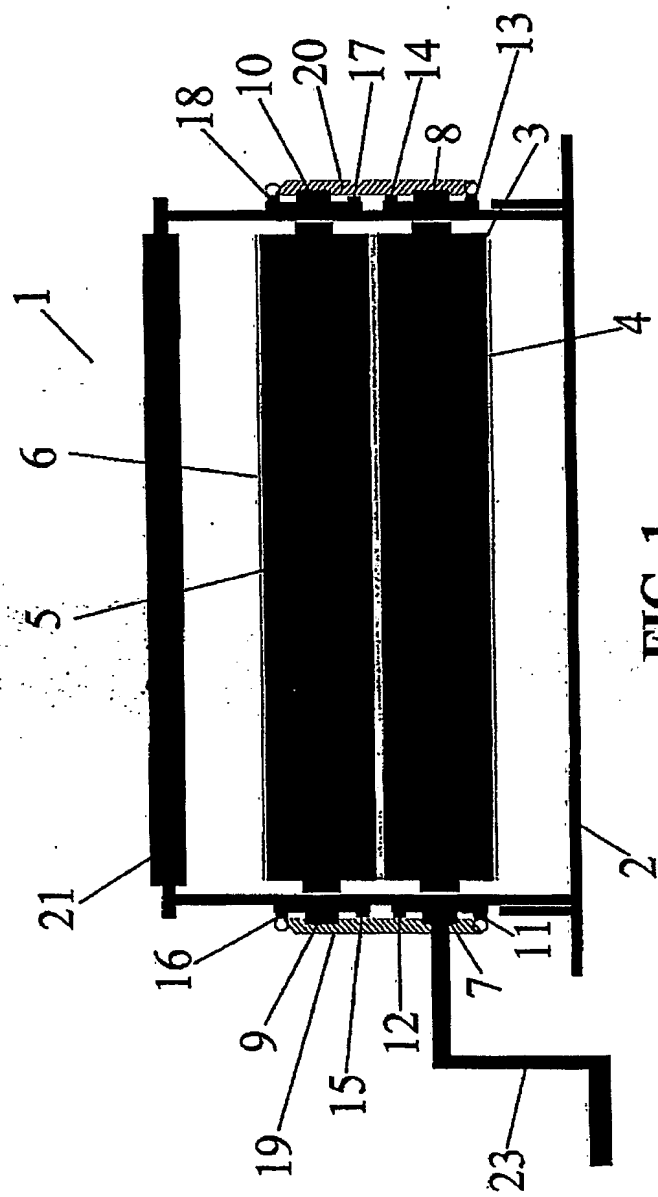
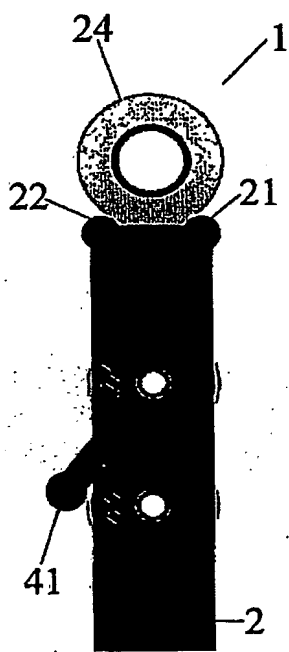
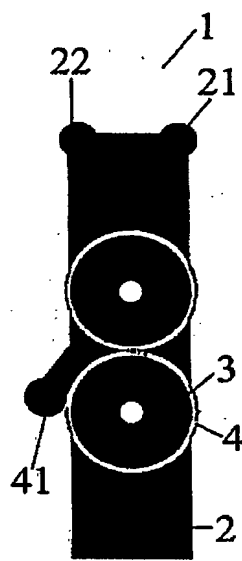


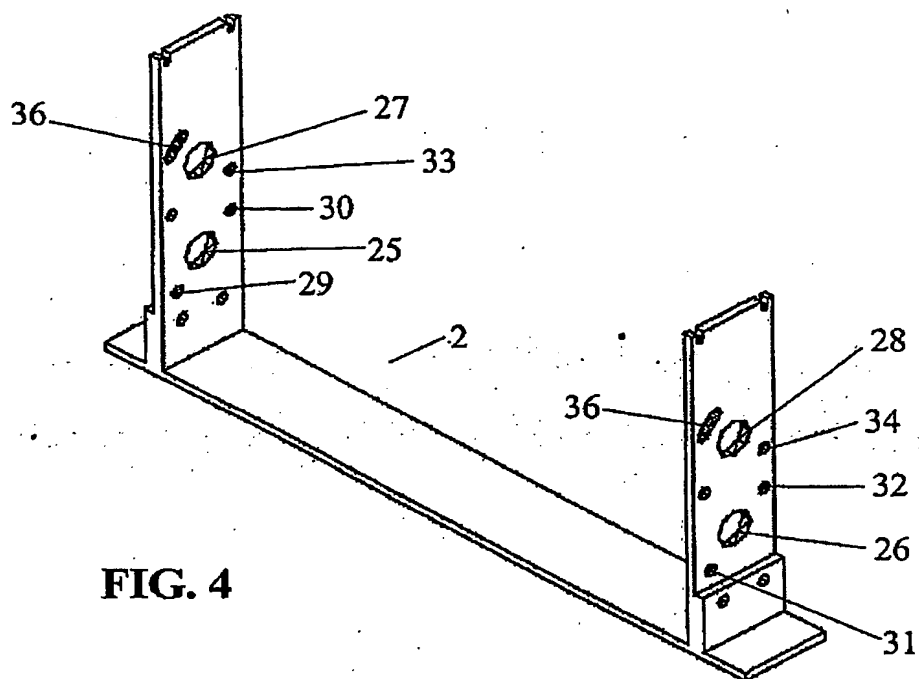
FIG. 1



**FIG. 2**



**FIG. 3**



**FIG. 4**

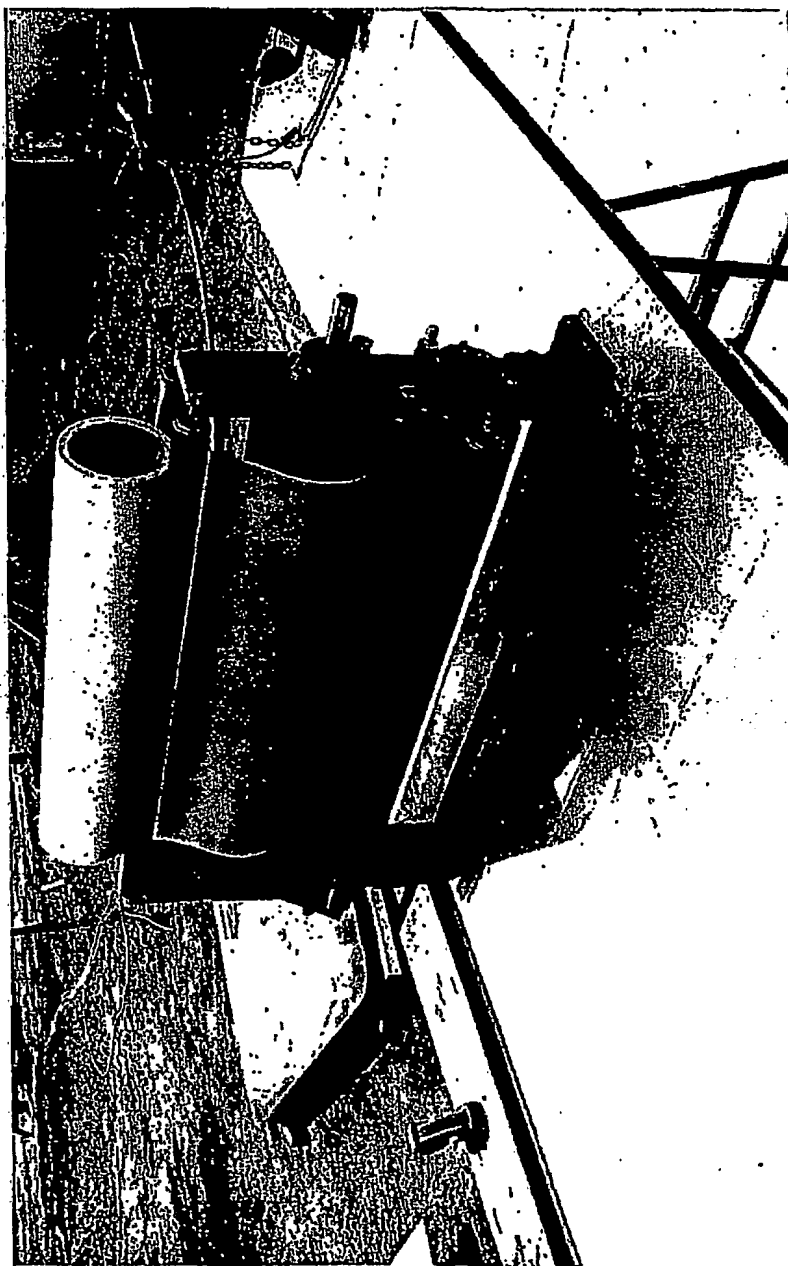


FIG. 5

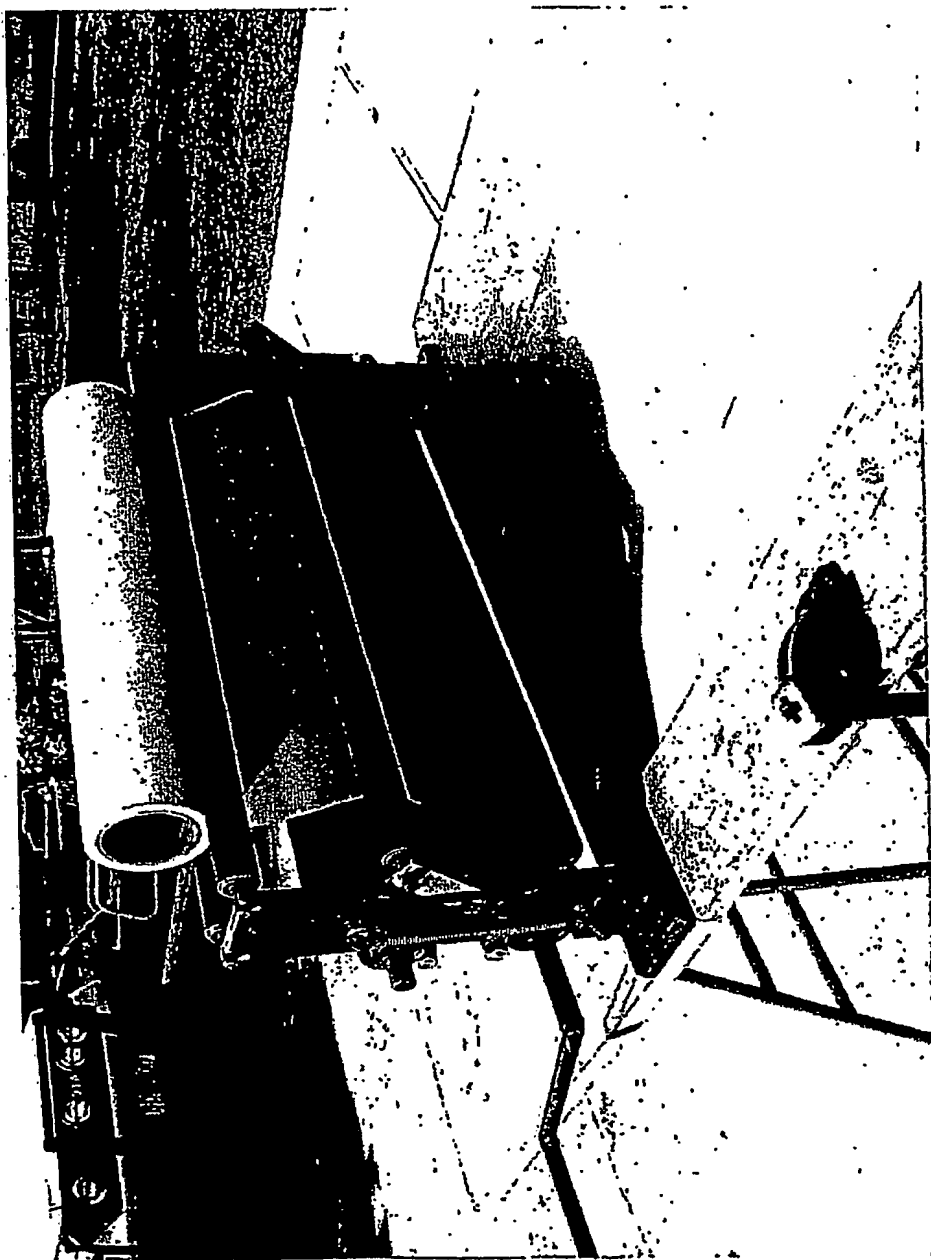


FIG. 6

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